
Chapter 4

Conveyance Needs

This chapter identifies the Conveyance System Improvement (CSI) projects and costs that provide a baseline for conducting benefit-cost analyses of potential Infiltration and Inflow (I/I) reduction projects. Flow monitoring and modeling data developed for the I/I control program were used to project CSI project needs to allow for an accurate comparison of benefits and costs between CSI projects and I/I reduction projects. As a result, the complete list of CSI projects reported here differs from what is included in the Regional Wastewater Services Plan (RWSP), as updated in 2004.

4.1 List of CSI Projects

Table 4-1 summarizes the list of 63 CSI projects that would meet the region's projected capacity needs through 2050. The projects identified are based on the data gathering and modeling efforts of base flow and I/I generation that was done for the I/I control program, as described in Chapter 3 of this report. The projects, estimated project costs, and estimated online date for each project are based on projected 20-year peak flow volumes, and were developed to provide a basis for conducting benefit-cost analyses of potential I/I reduction projects.

Table 4-1. Conveyance System Improvement Projects and Estimated Project Costs

Project #	Project List	Project Type	Year Online ¹	Estimated Project Cost ²
1	Bear Creek Interceptor Extension	Gravity Line	1998	\$400,000
2	Alderwood	Acquisition of Facilities	2001	\$16,700,000
3	Swamp Creek	Gravity Line	2003	\$10,700,000
4	ESI-11 - Wilburton Siphon/Wilburton Odor Control	Gravity Line	2003	\$3,900,000
5	Off-line Storage at North Creek	Storage Facility	2004	\$33,800,000
6	ESI-1 (2)	Gravity Line	2004	\$8,700,000
7	Fairwood Interceptor (formerly Madsen Creek)	Gravity Line	2005	\$21,600,000
8	McAleer I/I Work	I/I rehab work (opportunity)	2005	\$3,200,000
9	Pacific Pump Station	Pump Station Upgrade	2006	\$7,800,000
10	York PS Subtotal	Pump Station Upgrade	2007	\$10,000,000
11	Lake Line Connections and Flap Gates	Gravity Line	2007	\$1,400,000
12	Juanita Bay Pump Station	Pump Station	2007	\$33,100,000
13	Sammamish Plateau WSD	Acquisition of Facilities	2007	\$9,400,000
14	Hidden Lake PS/Boeing Trunk	Pump Station Upgrade and Gravity Line	2008	\$28,500,000
15	Kirkland Pump Station and Force Main Upgrade	Pump Station and Force Main Upgrade	2008	\$9,600,000
16	Auburn	Interceptor Extension	2008	\$11,500,000
17	[CSI] North Creek 1-A	Gravity Line	2009	\$16,900,000

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18	[CSI] Stuck River Diversion 1	Gravity Line	2009	\$5,200,000
19	[CSI] Stuck River Diversion 2	Gravity Line	2009	\$2,300,000
20	[CSI] Auburn West Valley Replacement - Section C	Gravity Line	2009	\$12,400,000
21	[CSI] Auburn West Valley Replacement - Section A	Gravity Line	2009	\$2,900,000
22	[CSI] Auburn West Valley Replacement - Section B	Gravity Line	2010	\$25,200,000
23	[CSI] Soos Alternative 3A(3) - PS D w/ Conveyance	New Pump station, Force Main and Gravity Sewers	2010	\$35,700,000
24	South Lake City: NWW13-02 TO NWW10-01	Gravity Line	2011	\$100,000
25	[CSI] Soos Alternative 3A(3) - PS H w/ Conveyance	New Pump station, Force Main and Gravity Sewers	2011	\$42,700,000
26	Piper Creek: T-12 to T-5	Gravity Line	2012	\$500,000
27	Piper Creek: T-23 D TO T-12	Gravity Line	2013	\$2,200,000
28	Issaquah1 Trunk Pipeline Bifurcation	New Gravity Line	2014	\$1,400,000
29	Bellevue Influent Trunk	New Gravity Line	2015	\$2,600,000
30	North Mercer and Enatai Interceptors	New Gravity Line	2016	\$10,800,000
31	Medina Trunk Minor Upgrade	New Gravity Line	2019	\$100,000
32	[CSI] Thornton Creek Interceptor - Sections 1 & 2	New Gravity Line	2019	\$3,300,000
33	Bryn Mawr Storage	New Storage Facility	2020	\$8,200,000
34	[CSI] Coal Trunk Replacement	New Gravity Line	2020	\$6,800,000
35	Factoria Trunk and Wilburton Upgrade	New Gravity Line, Pump Station Upgrade	2020	\$27,900,000
36	[CSI] Sammamish Plateau Diversion	New Gravity Line	2020	\$18,800,000
37	[CSI] Thornton Creek Interceptor - Section 3	New Gravity Line	2022	\$2,400,000
38	[CSI] Mill Creek Relief Sewer	New Gravity Line	2022	\$5,000,000
39	North Soos Creek Interceptor	New Gravity Line	2022	\$5,600,000
40	Heathfield/Sunset Pump Station and Force Main Upgrade	New Force Main, Pump Station Upgrade	2022	\$16,000,000
41	Eastgate Trunk	New Gravity Line	2022	\$1,800,000
42	Medina New Storage	New Storage Facility	2023	\$3,600,000
43	[CSI] Soos Alternative 3A(3) - PS B w/ Conveyance	New Force Main, New Pump, New Gravity Line	2023	\$10,600,000
44	Northwest Lake Sammamish Interceptor	New Gravity Line	2024	\$28,900,000
45	Rainier Vista Trunk	New Gravity Line	2024	\$600,000
46	Garrison Creek Trunk	New Gravity Line	2024	\$12,900,000
47	Lake Hills Trunk Fourth Barrel Addition	New Gravity Line	2025	\$12,400,000
48	[CSI] North Creek 2-A	Gravity Line	2026	\$45,500,000
49	[CSI] Swamp Creek Parallel - Section 1B	New Gravity Line	2026	\$7,300,000
50	Algona Pacific Trunk Stage 1	New Gravity Line	2026	\$4,300,000
51	[CSI] Issaquah New Storage	New Storage Facility	2026	\$15,100,000
52	[CSI] Sammamish Plateau Storage	New Storage Facility	2027	\$20,500,000
53	Issaquah Creek Highlands New Storage	New Storage Facility	2029	\$3,900,000
54	Planning, Studies, Administration, and Program Development	Ongoing Program	2030	\$15,200,000
		Sub-Total of Projects Needed by 2030		\$648,000,000
55	Auburn3 New Storage	New Storage Facility	2030-2050	\$33,800,000
56	[CSI] North Creek 3-A	New Gravity Line	2030-2050	\$6,700,000
57	Lakeland Trunk	New Gravity Line	2030-2050	\$4,800,000
58	ULID 1 Contract 4	New Gravity Line	2030-2050	\$2,300,000
59	Issaquah2 Trunk	New Gravity Line	2030-2050	\$2,300,000

Project #	Project List	Project Type	Year Online ¹	Estimated Project Cost ²
60	South Renton Interceptor	New Gravity Line	2030-2050	\$6,900,000
61	North Creek Trunk	New Gravity Line	2030-2050	\$4,000,000
62	Algona Pacific Trunk Stage 2	New Gravity Line	2030-2050	\$1,300,000
63	Lakeland Hills Pump Station Upgrade	New Force Main, Pump Station Upgrade	2030-2050	\$3,700,000
34-2nd phase	[CSI] Coal Trunk Replacement	New Gravity Line	2030-2050	\$7,000,000
30-2nd phase	North Mercer and Enatai Interceptors	New Gravity Line	2030-2050	\$12,000,000
36-2nd phase	[CSI] Sammamish Plateau Diversion	New Gravity Line	2030-2050	\$4,600,000
40-2nd phase	Heathfield/Sunset Pump Station and Force Main Upgrade	New Force Main, Pump Station Upgrade	2030-2050	\$21,900,000
52-2nd phase	[CSI] Sammamish Plateau Storage	New Storage Facility	2030-2050	\$7,200,000
51-2nd phase	[CSI] Issaquah New Storage	New Storage Facility	2030-2050	\$4,900,000
48-2nd phase	[CSI] North Creek 2-A	Gravity Line	2030-2050	\$7,200,000
		Sub-Total of Projects Needed between 2031 & 2050		\$130,600,000
		Total of Project Cost Estimates¹		\$778,600,000

¹ Year online balances capacity needs with estimated funding availability.
² All estimated costs are in 2003 dollars.

4.2 Comparison of Projects and Estimated Costs to the Updated RWSP

The updated RWSP contains a list of CSI projects and a cost estimate of approximately \$638 million (2003 dollars). The RWSP identified CSI needs through 2030. The list of CSI projects and estimated costs for the same time-period contained in this RNA are approximately \$648 million. The approximate 2-percent difference in the cost estimates is attributable to the fact that more detailed flow monitoring and modeling data developed for the I/I control program were used to project CSI project needs. Again, this was done to allow for an accurate comparison of benefits and costs between CSI projects and I/I reduction projects. When the RWSP was updated in early 2004, flow monitoring and modeling data were not available for the entire service area or at the level of detail available today. The projected cost estimate for all 63 CSI projects through 2050 is approximately \$779 million (2003 dollars).

The flow monitoring and modeling data developed for the I/I control program indicate that I/I levels in certain areas of the region are greater than the assumptions used to update the RWSP. Based on a comparison of these modeled flows to the capacity of the conveyance system, 10 additional projects¹ not previously identified in the updated RWSP were included in the list of CSI projects included in Table 4-1. Two projects² that were included in the updated RWSP were not listed in Table 4-1 because modeled flows in a portion of the system were less than those assumed for the RWSP update. Additionally, the flow monitoring and modeling data allowed for

¹ Project Nos. 28, 29, 31, 33, 35, 42, 44, 45, 47, and 50 in Table 4-1.

² Effluent Transfer System (ETS) Storage project and Tukwila Freeway Crossing project.

projecting flows and capacity needs from 2031 through 2050.³ Therefore, additional projects anticipated to be needed between 2031 and 2050 are included in this RNA. Their estimated cost is approximately \$131 million.

The CSI projects and estimated costs listed in Table 4-1 assume that the rate of growth in base flow will grow as population and employment grow in the region and that I/I will continue unchecked into the future. In other words, the cost estimate for expanding the capacity of the regional conveyance system assumes no action will be taken to reduce capacity demand by reducing flow volumes. This assumption is necessary to provide a baseline for conducting benefit/cost analyses of potential I/I reduction projects.

Projects 1 through 23 in Table 4-1 are either complete or in the predesign, design, or construction phase and will not be included in I/I benefit-cost analyses. Figure 4-1 identifies the location of the CSI projects by project number as listed in Table 4-1.

4.3 Correlation to I/I Flows

Figure 4-2 shows the location of needed CSI projects in relation to metered I/I levels in mini-basins⁴ throughout the service area. As can be seen, a number of the improvement projects are near mini basins with relatively high I/I flows. As was discussed earlier, I/I significantly affects the capacity of the region's wastewater conveyance and treatment system. During storm events, I/I is by far the largest contributor to wastewater volumes that must be conveyed and treated. If I/I flows could be reduced in targeted mini basins, it may be possible to reduce the need for conveyance system improvements because the capacity needed to convey and treat wastewater from these mini basins would also be reduced.

³ The year 2050 is the projected date when the regional wastewater service area will be fully built out and all portions of the service area will be connected into the wastewater treatment system.

⁴ Mini basins are geographically isolated areas that show variation in I/I flow rates. There are 775 mini basins that average 150 acres in size and contain approximately 22,000 lineal feet of pipe. See Chapter 3 of this report for a more detailed discussion of mini basins.

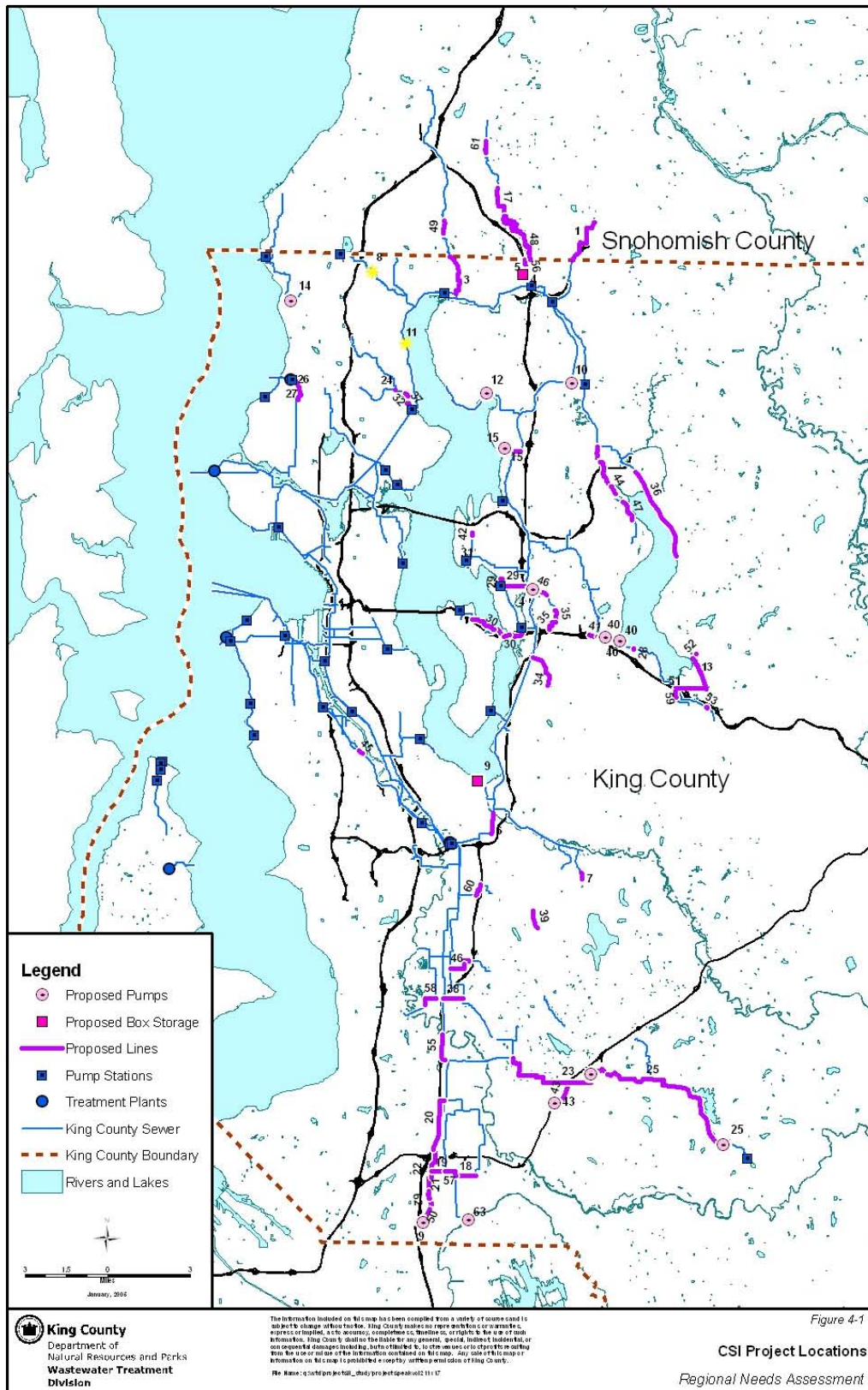


Figure 4-1. Conveyance System Improvement Project Locations

4.4 Approach to Providing Capacity and Reducing Cost

The capacity needed to convey and treat peak flows in the region can be provided by expanding the capacity of the conveyance system, or by trying to first reduce flows and thereby reduce the capital investments necessary to upgrade the conveyance system. The region is investigating the feasibility of the latter approach based on policy direction contained in the adopted RWSP. Policy I/IP-1 states that the County will “reduce I/I whenever the cost of rehabilitation is less than the cost of conveying and treating the flow or when rehabilitation provides significant environmental benefits to water quantity, water quality, stream flows, wetlands, or habitat for species listed under the ESA.”⁵ Since 2000, the County and local agencies have been working to develop an I/I control program that will reduce I/I flows and reduce the cost of providing adequate capacity for the region’s wastewater through 2050.

This RNA provides the baseline for measuring the costs and benefits of implementing I/I reduction projects to reduce flow volume in lieu of making a capital investment in the conveyance system. The County and local agencies will continue to work together to estimate the costs of I/I reduction projects upstream of identified conveyance improvement projects. The costs of conveyance system improvements identified in Table 4-1 will be compared with the estimated costs of reducing I/I levels to arrive at the cost-effectiveness comparison on a project specific basis.

4.5 Next Steps

The CSI projects identified in Table 4-1 that have been completed or are in the predesign, design, or construction phases will need to be designed and built within the next few years and will not be included in the I/I benefit-cost analysis. For the remaining conveyance system improvement projects, flow and benefit-cost analyses will be conducted in 2005 to determine if I/I reduction projects can cost-effectively reduce or eliminate the need for adding conveyance capacity. A list of cost-effective I/I projects and their associated cost savings will be included in the Executive’s proposed I/I Program Recommendation that is due to the County Council by December 31, 2005.

⁵ Endangered Species Act (ESA).